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FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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In the Matter of

Access Charge Reform

CC Docket No. 96-262

Price Cap Performance Review  
for Local Exchange Carriers

CC Docket No. 94-1

REPLY COMMENTS OF  
FOCAL COMMUNICATIONS CORPORATION

Focal Communications Corporation ("Focal") submits these reply comments concerning the revised proposal of the Coalition for Affordable Local and Long Distance Service ("CALLS").<sup>3</sup>

I. INTRODUCTION

Harm to local service competition and preservation of incumbent local exchange carrier ("ILEC") interstate access charge revenues are firmly planted at the center of the CALLS proposal. These goals would be achieved by arbitrarily shifting X Factor reductions to competitively sensitive areas and simultaneously insulating a significant portion of ILEC revenues from competitive pressures by moving them to a new arbitrary universal service fund. The IXC members of CALLS are prepared to support this approach because these goals are also achieved in part by shifting charges from IXCs to end users. The Commission should reject the CALLS proposal. At a minimum, if the Commission moves forward within the framework of

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<sup>3</sup> Coalition for Affordable Local and Long Distance Service Modified Proposal, Public Notice, CC Docket Nos. 96-262, 94-1, 99-249, 96-45, DA 00-52, released March 8, 2000.

access charge and price cap changes proposed by CALLS, it should modify the proposal along the lines suggested by ALTS/Time Warner.

## **II. THE CALLS PROPOSAL IS ANTICOMPETITIVE**

The proposed targeting of X Factor reductions to traffic sensitive baskets is inherently anticompetitive because it would use the X Factor to fund reductions in competitively sensitive areas while protecting revenues in less competitive areas -- common line -- from X Factor reductions. All CLEC services are subject to the downward price pressure of gains in efficiencies in telecommunications technology. They do not enjoy the advantages of incumbency and market dominance in the provision of loops that could permit them to maintain high loop prices (to the limited extent that CLECs provide loops) notwithstanding any productivity gains in loop technologies such as fiber and DSL. And yet that is exactly what ILECs propose. By immunizing common line from X factor reductions and targeting all productivity gains to competitively sensitive services, CALLS ILECs would confer on themselves the enormous competitive advantage of preserving revenues where they possess great market power - the local loop - while using the dollar amount of productivity gains properly attributable to common line to fund rate reductions in more competitively sensitive areas. In contrast, because they provide only fully competitive services, CLECs are subject to the competitive pressures of the marketplace, and must reduce prices to fully reflect productivity and efficiency gains for all the services that they provide.

Focal stresses that the Commission does not need to amend the price cap scheme to permit ILECs to price below price cap indices in order to meet competition. ILECs already have

the ability to price lower than price cap indices.<sup>4</sup> In addition to being totally arbitrary, allowing ILECs to use the X Factor to fund competitive reductions reduces the overall scope of interstate access charge reductions. Thus, the CALLS plan simultaneously would preserve ILEC revenues while harming competition. Accordingly, in no event should the Commission ever permit ILECs to use the X Factor in the manner proposed by CALLS.

### **III. X FACTOR TARGETING IS ARBITRARY AND UNLAWFUL**

Focal's initial comments point out that there is not so much as a scrap of economic reasoning or factual support in the CALLS proposal that could justify the crazy pattern of X Factors spread all over price caps that CALLS asks the Commission to adopt.<sup>5</sup> To the extent initial comments address X Factor targeting, they support the conclusion that there is no economic foundation for it. NASUCA points out that communications technology represented in the common line basket have experienced very high productivity gains, such as through xDSL technologies.<sup>6</sup> Thus, shielding common line rates from productivity gains as CALLS proposes is precisely the opposite of what may be appropriate based on actual productivity gains in common line services. More importantly, however, there is simply no basis on the present record for departing from the current application of the X Factor uniformly across all price cap access baskets. Significantly, CALLS' first round comments continue to ignore any need for a rational

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<sup>4</sup> *Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Transport Rate Structure and Pricing, End User Common Line Charges*, Report and Order, CC Docket Nos 96-262, 94-1, 11 FCC Rcd 21354, 21487 (1996) ("*Access Reform NPRM*").

<sup>5</sup> Focal p. 6. Attached to these reply comments is a copy of the signed statement of Professor Jeffrey I. Bernstein that was submitted unsigned with Focal's comments filed April 3. Also attached is Professor Bernstein's Curriculum Vitae.

<sup>6</sup> NASUCA p. 19.

explanation of its proposed application of the X Factor. CALLS makes no attempt to provide an economic justification for the proposed targeting.

Focal would be quite frankly amazed if the Commission were to accept CALLS' proposal to establish a new approach to application of the X Factor without any economic justification. The United States Court of Appeals for the D.C. Circuit has instructed the Commission to exercise more care in developing and explaining the X Factor.<sup>7</sup> CALLS' proposal is not consistent with this direction to the Commission.

#### **IV. THE PROPOSAL WOULD NOT BENEFIT CONSUMERS**

CALLS touts its proposal as benefitting consumers. Consumer groups have a different view. NASUCA, CPI, and Joint Consumer Commenters trash the CALLS proposal with respect to the purported consumer benefits. The CALLS proposal would increase total cost recovery in the federal jurisdiction by almost \$4 Billion,<sup>8</sup> double the cap on the SLC for primary lines,<sup>9</sup> shift the PICC from IXC's to consumers,<sup>10</sup> shield access revenues from competition by shifting recovery to end users,<sup>11</sup> and impose cost recovery on a captive customer base.<sup>12</sup> More broadly, the CALLS plan is "illegal, arbitrary and capricious, uneconomic and unfair,"<sup>13</sup> leaves consumers

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<sup>7</sup> *USTA v. FCC*, 188 F.3d 521 (D.C. Cir. 1999).

<sup>8</sup> Joint Consumer Commenters p. v.

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> CPI p. 1.

<sup>12</sup> NASUCA p. 2.

<sup>13</sup> Joint Consumer Commenters p. vi.

“holding the bag,” and is “unacceptable.”<sup>14</sup> Accordingly, contrary to CALLS high-minded rhetoric, its proposal would not benefit consumers.

## V. AN OPTIONAL CALLS SCHEME WOULD NOT CURE LEGAL DEFECTS

Focal and other CLECs are vitally interested in the price cap scheme governing ILEC interstate access charges. The Commission has recognized that changes in the access charge and price cap regulatory scheme impacts competitors of ILECs.<sup>15</sup> The Commission is conducting extensive proceedings examining the extent to which the price cap and access charge scheme should be adjusted to reflect competition.<sup>16</sup> The Commission has recognized that premature or inappropriate changes in this regulatory scheme can harm competition.<sup>17</sup> And, the Commission has recognized that the access charge and price cap scheme must be crafted to minimize any incorrect economic signals to price cap ILECs, their customers, and their competitors.<sup>18</sup> In short, the price cap and access charge scheme governing price cap ILECs profoundly affects the entire industry, including CLECs.

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<sup>14</sup> CPI p. 2.

<sup>15</sup> *Access Reform NPRM*, 11 FCC Rcd 21354, 21428 (stating that ILEC pricing flexibility proposals will affect small entities “especially competitive LECs”).

<sup>16</sup> *Id.* *Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Transport Rate Structure and Pricing, End User Common Line Charges, Report and Order*, CC Docket Nos 96-262, 94-1, 14 FCC Rcd 14221 (1999)(“*Pricing Flexibility Order and Further NPRM*”)

<sup>17</sup> *Access Reform NPRM*, *supra*.

<sup>18</sup> *Access Reform, Price Cap Performance Review for Local Exchange Carriers*, CC Docket Nos. 96-262, 94-1, Further Notice of Proposed Rulemaking, FCC 99-345, released November 15, 1999, para 14 (“*X Factor Remand NPRM*”).

For this reason, adoption of the CALLS plan as a voluntary optional price cap scheme would not cure its arbitrary and anticompetitive features. Instead, Focal submits that adoption of these types of price cap changes - even if voluntary - are subject to the same standard of reasoned decision making as rules of general applicability. Focal does not believe that the Commission would be able to meet this standard with respect to the current CALLS proposal. As discussed by Focal and other commenters, key features of the plan - such as the X Factor targeting and the proposed universal service fund<sup>19</sup> - are completely arbitrary. The plan would also harm competition and undermine price cap regulation. Focal submits that the Commission may not lawfully adopt these proposals merely because ILECs' implementation of them would be voluntary.

The Commission should reject CALLS' implicit suggestion that its negotiated package of suggested rule changes offers a streamlined resolution of the thorny issues of access reform. Instead, CALLS proposed voluntary rule changes are illegal shortcuts premised on an abandonment of traditional rulemaking requirements.

## **VI. THE ALTS/TIME WARNER PROPOSAL IS PREFERABLE**

The ALTS/Time Warner proposal, although working within the overall framework of changes that CALLS suggests, would constitute a vast improvement over the CALLS proposal. ALTS/Time Warner correctly identifies the numerous highly problematic features of the CALLS proposal. The CALLS proposal is a negotiated deal that reflects the specific interests of the negotiating parties that cannot withstand independent regulatory review.<sup>20</sup> It would prematurely

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<sup>19</sup> Even US West agrees that the proposed universal service fund is arbitrary, although it would prefer a much larger fund. US West p. 4.

<sup>20</sup> ALTS/Time Warner at 2.

abandon reliance on competition to remove implicit universal support from interstate access charges.<sup>21</sup> The CALLS proposal would discourage facilities-based competitive entry.<sup>22</sup> And, there is no basis for the proposed X Factor targeting.<sup>23</sup>

In contrast, the ALTS/Time Warner would substantially moderate the problematic features of the CALLS proposal. For example, the ALTS/Time Warner proposal to spread X Factor reductions across common line and traffic sensitive baskets 50/50 would blunt and circumscribe to some extent price cap ILECs' ability to misuse the X Factor as a tool to price traffic sensitive services anticompetitively. Since this anticompetitive targeting along with preservation of revenues are at the heart of the attractiveness of the CALLS proposal to ILECs, and is what constitutes the greatest threat to CLECs and to competition, the ALTS/Time Warner proposal would help address this problematic feature of the CALLS proposal. The ALTS/Time Warner approach would also improve upon the CALLS plan by establishing a smaller new universal service fund. Accordingly, if the Commission does not reject the CALLS proposal outright for the reasons discussed herein, the Commission should adopt the ALTS/Time Warner proposal instead of the CALLS plan.

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<sup>21</sup> *Id.* p. 3.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

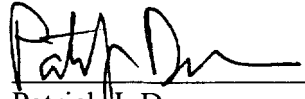
#### IV. CONCLUSION

For these reasons, Focal requests that the Commission reject the CALLS proposal. If the Commission does not do so, it should adopt the ALTS/Time Warner proposal.

Respectfully submitted,

Richard Metzger  
Vice President  
Regulatory Affairs and Public Policy  
Focal Communications Corporation  
7799 Leesburg Pike  
Suite 850 N  
Falls Church, VA 22043  
(703) 637-8778

Dated: April 17, 2000

  
Patrick J. Donovan  
Donna Coles Roberts  
Swidler Berlin Shereff Friedman, LLP  
3000 K Street, N.W., Suite 300  
Washington, DC 20007  
(202) 424-7500

Counsel for Focal Communications  
Corporation



## **CERTIFICATE OF SERVICE**

I hereby certify that a copy of the foregoing Reply Comments of Focal Communications Corporation in CC Docket No. 96-262 was sent by hand delivery, on this 17<sup>th</sup> day of April, 2000 to the parties on the attached list.



Candise M. Pharr

### **VIA HAND DELIVERY**

Magalie Roman Salas  
Secretary  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - TW-B204  
Washington, DC 20554

### **VIA HAND DELIVERY**

Sarah Whitesell  
Office of Commissioner Tristani  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

### **VIA HAND DELIVERY**

Dorothy Atwood  
Office of the Chairman  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

### **VIA HAND DELIVERY**

Jordan Goldstein  
Office of Commissioner Ness  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

### **VIA HAND DELIVERY**

International Transcription Service  
445 12<sup>th</sup> Street, SW - CY-B400  
Washington, DC 20554

### **VIA HAND DELIVERY**

Rebecca Beynon  
Office of Commissioner Furchgott-Roth  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

### **VIA HAND DELIVERY**

Lawrence E. Strickling  
Chief, Common Carrier Bureau  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

### **VIA HAND DELIVERY**

Wanda Harris (3)  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

### **VIA HAND DELIVERY**

Kyle Dixon  
Office of Commissioner Powell  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

### **VIA HAND DELIVERY**

Jane Jackson  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

**VIA HAND DELIVERY**

**VIA HAND DELIVERY**  
Richard Lerner  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

John Nakahata  
Karen Gulick  
Evan R. Grayer  
Harris Wiltshire & Grannis, LLP  
1200 18<sup>th</sup> Street, N.W.  
Washington, DC 20036

**VIA HAND DELIVERY**  
Tamara Priess  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

**VIA HAND DELIVERY**  
Jay Atkinson  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

**VIA HAND DELIVERY**  
Aaron Goldschmidt  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

**VIA HAND DELIVERY**  
Yog Varma  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 5<sup>th</sup> Floor  
Washington, DC 20554

**VIA HAND DELIVERY**  
Christopher Wright  
General Counsel  
Federal Communications Commission  
The Portals  
445 12<sup>th</sup> Street, SW - 8<sup>th</sup> Floor  
Washington, DC 20554

Department of Economics

Ottawa, Ontario, Canada

And

## Research Associate

National Bureau of Economic Research

Cambridge, Massachusetts, USA

April 3, 2000

Under existing rules the Federal Communications Commission (FCC) regulates interstate access charges through a price cap mechanism. Price cap regulation typically specifies an average rate at which prices must decline, after adjusting for inflation. This rate is called the  $X$  factor, and currently it is set at 6.5% for common line, local switching, and switched transport price cap baskets.

The Coalition for Affordable Local and Long Distance Services (CALLS) has submitted a proposal to the FCC that includes amendments to switched access usage rates, subscriber line charges and universal service fund assessments. This declaration maintains that the CALLS proposal should be rejected. The proposal does not provide any quantitative economic evidence that it is consistent with sound economic principles and the objectives of the 1996 Telecommunications Act, to promote competition, and encourage the rapid deployment of new telecommunications technologies.

With respect to switched access usage rates, CALLS proposes (page 2, Memorandum in Support of the Revised Plan of the CALLS); "A \$2.1 billion reduction in switched access usage rates on July 1, 2000, if all companies participate, and a nearly 50% reduction in switched access rates over five years...". Averaging the 50% reduction over five years translates to an annual reduction of 10%.<sup>1</sup> According to the price cap mechanism, the targeted reduction to switched access rates that CALLS proposes, along with an annual inflation rate realistically assumed to be 2%, implies an  $X$  factor of 12% ( $-10\% = 2\% - X$ , or  $X = 2\% + 10\%$ ). Moreover, inflation rates above 2% translate into  $X$  factors above 12%. Under the current mandated 6.5%  $X$  factor, CALLS proposes an annual 85% increase in the price cap offset.

Alternatively, the CALLS targeted 10% average annual reduction in switched access rates can be compared to the rate reduction mandated under current price caps. With a 2% inflation rate, the reduction would be 4.5% ( $2\% - 6.5\%$ ). CALLS proposal signifies annual reductions of more than 120% above the inflation adjusted decline possible under the existing price cap mechanism.<sup>2</sup> The CALLS proposal to target reductions in switched access usage rates is not based on quantitative economic evidence regarding improvements in economic efficiency, promoting competition, and encouraging innovation.

Since the CALLS proposal for switched access usage rates implies an  $X$  factor significantly above that mandated by the FCC, an issue arises as to the predatory nature of the targeted price reductions. In its Memorandum of Support of the Revised Plan, page 12, footnote 13, CALLS notes that, "In the comments and replies with respect to its original proposal, no party offered any evidence to support any claim that these reductions or target rates result in predatory prices". Among economists, there is widespread agreement in principle that 1) incremental costs would be the basis for efficient price floors, and 2) incremental costs would be forward-looking, rather than historical. Notwithstanding the difficulties in measuring and defining forward-looking incremental costs, as a practical matter, cost information is required for a determination of predatory prices. The CALLS proposal does not contain the relevant cost information. It further precludes an economic evaluation of switched access usage rate floors, by proposing that incumbent local exchange carriers would no longer be required to file cost studies on February 8, 2001 (see section 3.2.8 of the Modified Universal Service and Access Reform Proposal). In order to foster competition, and advance innovation, the FCC has determined that prices for interstate access, on average, should decline by 6.5% after adjusting for inflation. Due to the extraordinary and targeted price reductions for switched access usage rates, and the paucity of (reliable) cost information, the possibility of predatory prices should not be summarily discounted.

The CALLS targeted price reductions for switched access usage rates engenders insufficient revenues. To overcome revenue deficiency, CALLS proposes three further modifications to the FCC's price cap mechanism; i) reduction of price cap offset, ii) removal of revenues from price cap basket, iii) rebalancing of rates within price caps. Each of the three proposals procures significant modifications to the current price cap mechanism, potentially conflicts with the economic principles of price cap regulation, and contradicts a stated major objective of the CALLS proposal.

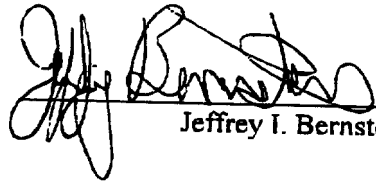
First, price cap offsets are reduced in the CALLS proposal. From page 13 of the Memorandum, "As discussed below, under the revised plan, special access rates are reduced in the first year by 3.0% rather than 6.5%." The offset reduction conflicts with a crucial goal of the CALLS plan. As noted on page 11 of the Memorandum, "The productivity offset or 'X-factor,' has been the subject of extensive regulatory proceedings and litigation, and it has created significant uncertainty in the marketplace. The CALLS plan is designed to end this regulatory gridlock by adopting an X-factor of 6.5% to reach target rates for local switching and switched transport." Moreover, since the current price cap mechanism groups transport and special access

services under the trunking basket, the 3% offset for special access implies that the transport offset must exceed 6.5% in the first year of the CALLS plan. Contrary to ending regulatory gridlock, the plan invites a new round of offset proceedings.

Further, the CALLS proposal contradicts the economic principles associated with price cap regulation. From section 3.2.2 of the Modified Universal Service and Access Reform Proposal, CALLS seeks the "... application of the X-factor adjustment in the price cap formula across all ... interstate price cap baskets, other than special access elements ...". In price cap regulation, offsets are applied to specific baskets. Aggregating baskets upon offset application, effectively alters, and can distort, targeted price reductions, compared to feasible rate decreases under disaggregated and mandated basket definition. Since offsets must be determined in conjunction with the services contained within a basket, redefining basket composition (e.g. aggregating baskets) is tantamount to redefining the effective offset. No evidence has been provided on the enhancement of economic efficiency, competition, and innovation through offset re-calibration, and redefining service baskets.

Second, CALLS recovers revenue from their targeted reductions in switched access usage rates through the removal of revenues from price cap baskets. Section 1.3 of the Modified Universal Service and Access Reform Proposal asserts that, "Upon implementation, ILEC USF assessments (a) are removed from existing price cap baskets ..., and (b) are not subject to the Price Cap formula in future years." Third, revenue recovery ensues from increases in subscriber line charges, as documented on page 7 of the Memorandum. These proposals are not supportable by recourse to economic principles or quantitative economic analysis. Indeed, a particularly egregious plan highlighting the targeted nature of the CALLS proposal for reductions in switched access usage rates relates to exogenous adjustments. Section 3.2.5 of the Modified Universal Service and Access Reform Proposal offers that, "After July 1, 2000, exogenous adjustments will be applied only to services other than those constituting traffic sensitive interstate access charges." However, if an adjustment is truly exogenous, economic principles dictate that it is not possible ex ante to assign adjustments to specific services. Prior assignment of adjustments is inconsistent with exogeneity.

For the reasons outlined above in this declaration, the CALLS proposal should be rejected.



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Jeffrey I. Bernstein

## Endnotes

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<sup>1</sup> The 10% average annual rate decrease excludes the July 1, 2000 \$2.1 billion reduction. There is insufficient information in the proposal to determine the annual percentage decline inclusive of the one-time reduction.

<sup>2</sup> The previous calculations assume for simplicity that the switched access basket consists of a single service. The argument is unaffected when multiple services are considered.



## CURRICULUM VITAE

### NAME AND ADDRESS

Jeffrey Ian Bernstein  
Department of Economics  
Carleton University  
1125 Colonel By Drive,  
Ottawa, Ontario, Canada  
K1S 5B6

Telephone: (613) 520-2600 ext. 3752  
Facsimile: (613) 520-2509  
Email: [jeff\\_bernstein@carleton.ca](mailto:jeff_bernstein@carleton.ca)

### EDUCATION

University of Western Ontario  
London, Ontario, Canada  
Ph.D. in Economics, 1975

University of Western Ontario  
London, Ontario, Canada  
M.A. in Economics, 1972

Sir George Williams University  
Montreal, Quebec, Canada  
B.A. in Economics with Distinction,  
Highest Honors, 1971

### ACADEMIC APPOINTMENTS

1984-	Professor Department of Economics Carleton University Ottawa, Ontario, Canada
-------	--

- 1981-1984 Associate Professor  
Department of Economics  
Carleton University  
Ottawa, Ontario, Canada
- 1978-1981 Assistant Professor  
Faculty of Management  
McGill University  
Montreal, Quebec, Canada
- 1975-1978 Assistant Professor  
Department of Economics  
Concordia University  
Montreal, Quebec, Canada

#### RESEARCH AND ADMINISTRATIVE APPOINTMENTS

- 1989- Research Associate  
Productivity Program  
National Bureau of Economic Research  
Cambridge, Massachusetts, USA
- 1989- Member  
Services Advisory Committee  
Statistics Canada  
Ottawa, Ontario, Canada
- 1999- Member  
Expert Panel  
Productivity Monitor  
Industry Canada and Center for the Study of Living Standards  
Ottawa, Ontario, Canada
- 1999-2000 Member  
Research Advisory Committee  
US-Canadian Productivity Gap  
Center for the Study of Living Standards  
Ottawa, Ontario, Canada
- 1997-1998 Advisor  
Project to Improve Provincial Economic Statistics  
Statistics Canada

Ottawa, Ontario, Canada

- |           |   |
|-----------|---|
| 1996-1997 | Member<br>Research Advisory Committee<br>Service Sector Productivity<br>Center for the Study of Living Standards<br>Ottawa, Ontario, Canada |
| 1992-1993 | Chair<br>Canadian Social Sciences and Humanities Research Council<br>Economics Committee<br>Ottawa, Ontario, Canada                         |
| 1990-1992 | Member<br>Canadian Social Sciences and Humanities Research Council<br>Economics Committee<br>Ottawa, Ontario, Canada                        |
| 1988-1991 | Director<br>Center for Quantitative Social Sciences<br>Carleton University<br>Ottawa, Ontario, Canada                                       |
| 1983-1987 | Supervisor<br>MA Studies<br>Department of Economics<br>Carleton University<br>Ottawa, Ontario, Canada                                       |
| 1979-1980 | Member<br>Airlines Advisory Board<br>Regulation Reference<br>Economic Council of Canada<br>Ottawa, Ontario, Canada                          |
| 1978-1981 | Coordinator<br>Regulated Industry Management Concentration<br>MBA Program<br>McGill University<br>Montreal, Quebec, Canada                  |
| 1978-1981 | Member<br>Center for the Study of Regulated Industries  |

McGill University  
Montreal, Quebec, Canada

1975-1978    Research Associate  
Institute for Applied Economic Research  
Concordia University  
Montreal, Quebec, Canada

## RESEARCH FIELDS

Applied Industrial Economics and Policy  
Telecommunications, Financial Services, and E-Commerce  
Productivity, R&D, and Innovation

## PUBLICATIONS

### JOURNAL ARTICLES

“Canadian Manufacturing, Communication Infrastructure, and U.S. R&D Spillovers”, forthcoming Review of Economics and Statistics.

“Productivity Growth, R&D Spillovers and Tax Policies in the US and Canada”, forthcoming Research Policy.

“The Canadian Corporate Tax Structure and the Effects on Production, Cost, and Efficiency”, forthcoming International Tax and Public Finance.

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## BOOK CHAPTERS

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"Corporate Taxes and Incentives and the Structure of Production: A Selective Survey", (with M.I. Nadiri), in J. Mintz and D. Purvis eds., Taxes and Business Activity, John Deutsch Institute Papers on Economic Policy, 1988, 178-208.

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## SUBMITTED PAPERS

"Productivity Growth in the Canadian Property/Casualty Insurance Industry", 2000.

"Factor Accumulation, Quality Change and Productivity Growth for U.S. Manufacturing", (with T. Mamuneas and P. Pashardes), 1999.

## RESEARCH IN PROGRESS

"Productivity Growth in the U.S. and Canadian Property/Casualty Insurance Industry (SSHRC Grant)

"Business Financing Indicators and Canadian Financial Intermediaries (Statistics Canada)

"E-Commerce and Canadian Productivity Growth" (Industry Canada)

## MONOGRAPHS AND REPORTS

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"Financial Services and the U. N. Revisions to the National Accounts", presented at the Brookings Institution Conference on Financial Services, Washington, D.C., April 1999.

"The Canadian Corporate Tax Structure and the Effects on Manufacturing Production, Cost and Efficiency", presented at the NBER Summer Institute, Boston, U. S. A., July 1998.

"Plant Size, Efficiency and Short-Run Equilibrium: With an Application to Canadian Establishments", (joint with Peter Koumanakos) presented at the NBER Summer Institute, Boston, U.S.A., July 1997.

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"R & D Spillovers and Productivity Growth: The Case of U.S. and Canada", (with P. Mohnen), presented at the Canadian Economics Association Meetings, Calgary, Canada, June 1994.

"International R & D Spillovers Between U.S. and Japanese R & D Intensive Sectors", (with P. Mohnen) presented at the American Economic Association Meetings, Anaheim, U.S.A., January 1993.

"Production, Financing and the Decomposition of U.S. Productivity Growth", (with M.I. Nadiri) presented at the C.V. Starr Centre Conference on Growth and Spillovers, New York, U.S.A., December 1992.

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"R&D Capital, Spillovers and Foreign Affiliates in Canada", presented at the Industry Canada Conference on Foreign Investment, Ottawa, Canada, March 1991.

"A Dynamic Model of Product Demand, Cost of Production and Interindustry R & D Spillovers", (with M.I. Nadiri) presented at the joint session of the American Academy for the Advancement of Science and the American Economic Association Meetings, Washington, U.S.A., December 1990.

"Capacity, Exports and Markups in the Canadian Lumber Industry", presented at the European Association for Research in Industrial Economics Meetings, Budapest, Hungary, August 1989.

"An Empirical Analysis of the Dynamics of Production and Financing with Adjustment and Transactions Costs", (with M.I. Nadiri) presented at the NBER Summer Institute, Boston, U.S.A., July 1988.

"Trade, Prices and Production in Three Canadian High-Tech Industries", (with Pierre Mohnen), presented at the Canadian Economic Association Meetings, Windsor, Canada, June 1988.

"Interindustry R&D Spillovers, Rates of Return and Production in High-Tech Industries", (with M.I. Nadiri), presented at the American Economic Association Meetings, Chicago, U.S.A., December 1987.

"The Structure of Canadian Interindustry R&D Spillovers and the Rates of Return to R&D", presented at the NBER Summer Institute, Boston, U.S.A., July 1987.

"Research and Development and Interindustry Spillovers: An Application of Dynamic Duality", (with M.I. Nadiri) presented at the NBER Summer Institute, Boston, U.S.A., July 1986.

"Dynamic Factor Demands and Adjustment Costs: An Analysis of Bell Canada's Technology", presented at the Telecommunications Program of the International Symposium on Forecasting, Paris, France, June 1986.

"Effective Taxation and the Structure of Production: A Survey", (with M.I. Nadiri), presented at the Department of Finance Conference on Taxation, Production and Investment, Ottawa, Canada, November 1985.

"Costs of Production, Intra and Interindustry R&D Spillovers: Canadian Evidence", presented at the NBER Summer Institute, Boston, U.S.A., July 1985.

"Patents, Research and Development and Corporate Ownership", presented at the John Deutsch Roundtable on Economic Policy, Kingston, Canada, July 1984.

"Research and Development and Tax Incentives: Evidence on their Effectiveness", presented at the Royal Society of Canada Meetings, Toronto, Canada, May 1984.

"Research and Development and Dynamic Factor Demands: An application of Dynamic Duality", (with M.I. Nadiri) presented at the Econometric Society Meetings, San Francisco, U.S.A., December 1983.

"Financing and Investment in Plant and Equipment and Research and Development", (with M.I. Nadiri) presented at the NBER Summer Institute, Boston, U.S.A., July 1983.

"Research and Development, Factor Utilization and Intensity", (with M.I. Nadiri) presented at the Canadian Economic Association Meetings, Vancouver, Canada, June 1983.

"Regulatory Reform of Oil Pipelines in Canada", presented at National Energy Board Conference on Regulating Pipelines, Montreal, Canada, November 1982.

"Research and Development, Utilization and Labor Requirements: A Dynamic Analysis", (with M.I. Nadiri) presented at the NBER Summer Institute, Boston, U.S.A., August 1982.

"Taxes, Financing and Investment for a Regulated Firm", presented at the Conference on Telecommunications in Canada: Economic Analysis of the Industry, Montreal, Canada, March 1981.

"The Term Structure of Interest Rates and the Demand for Money: British Results from a Portfolio Model", (with D. Fisher), presented at the Southern Economic Association Meetings, Washington, U.S.A., November 1980.

"Corporate Econometric Modelling", presented at the International conference on Analysis Forecasting and Planning for Public Utilities, INSEAD, Fontainebleau, France, June 1980.

"A Corporate Econometric Model of the British Columbia Telephone Company", presented at the Public Utilities Forecasting Conference, Nottingham, England, March 1980.

"Oil Pipeline Regulation in Canada: An Institutional and Theoretical Analysis", (with J. McPherson) presented at the Canadian Economic Association Meetings, Saskatoon, Canada, May 1979.

"The Demand for Money and the Term Structure of Interest: A Portfolio Approach", (with D. Fisher) presented at the Econometric Society Meetings, Chicago, U.S.A., August 1978.

"A Simulation Model of Optimal Production and Financing for a Regulated Firm: The Case of Telecommunications", presented at the Canadian Statistical Society Meeting, London, Canada, May 1978.

"Consumption, the Term Structure of Interest Rates and the Demand for Money", (with D. Fisher) presented at the American Economic Association Meetings, New York, U.S.A., December 1977.

"Forecasting Techniques: Application to the Telecommunications Industry", (with V. Corbo and R.S. Pindyck), presented at the Public Utilities Forecasting Conference, Bowness-on-Windermere, England, March 1977.

## RESEARCH GRANTS AND AWARDS

1999-2002	Social Sciences and Humanities Research Council Project on Corporate Taxes, and Production in Canadian and US Industries
1999-2000	Statistics Canada Project on US and Canadian Productivity
1997-2000	Social Science and Humanities Research Council Project on the Insurance Industry
1998-1999	Statistics Canada Project on US and Canadian Productivity
1997-1998	Industry Canada Project on Corporate Tax Structure
1996-1997	Industry Canada Project on US, and Canadian R&D Spillovers
1990-1993	Social Science and Humanities Research Council Project on International R&D Spillovers
1991-1993	World Bank Project on Corporate Taxes, and Production
1990-1991	Statistics Canada Project on Capital Depreciation and Production
1989-1990	Statistics Canada Project on Research and Development Capital
1987-1989	Federal Department of Agriculture Project on Taxation and the Forestry Industries

1987-1988	Federal Department of Finance Project on Corporate Taxation and Production
1986-1987	Science Council of Canada Project on R&D Expenditures and Interindustry Spillovers
1984-1985	Science Council of Canada Project on R&D Expenditures and Spillovers
1984-1986	Social Science and Humanities Research Council Project on Consumer Demand for Durables
1984-1985	Statistics Canada Project on Price Indexes for Research and Development Expenditures
1983-1984	Statistics Canada Project on Research and Development and Industrial Productivity
1983-1985	Canadian Transport Commission Project on Investment and Cost Structure of the Canadian Airline Industry
1982-1984	National Science Foundation Project on Research and Development and Productivity
1982-1983	Federal Department of Regional Industrial Expansion Project on Research and Development Investment and Corporate Ownership
1982-1983	Ontario Economic Council Project on Research and Development Production and Tax Incentives
1982-1983	Federal Department of Consumer and Corporate Affairs Project on Patents, Research and Development and Production
1981-1982	National Science Foundation Project on Financing and Research and Development
1979-1980	Economic Council of Canada Regulation Reference Project on the Incidence of the Cost of Compliance with Government Regulation



- 1978-1979    Federal Department of Communications  
Project on the Information Economy
- 1977-1978    Federal Department of Communications  
Project on the Cost Structure of Telecommunications
- 1976-1977    Federal Department of Communication  
Project on the Demand Structure of Telecommunications

#### MEMBERSHIP IN PROFESSIONAL SOCIETIES AND RELATED ACTIVITIES

- 1995    Industry Canada  
Distinguished Lecture  
Research and Development

American Economics Association  
Canadian Economics Association  
Econometric Society  
Conference on Research in Income and Wealth  
European Industrial Economics Association

Author of Book Reviews  
Referee for Journals, Publishers, and Research Organizations  
Discussant and Chair of Sessions at Conferences  
Commentator for the Media